



## Fixed Gear Sampling

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## Introduction

Vessels in the Catch Share program are allowed to switch from trawl gear to fixed gear to target certain species, such as sablefish. Although observers in the Catch Share program will primarily be sampling on vessels with trawl gear, it is important to know the sampling priorities and procedures on fixed gear.

Fixed gear vessels target sablefish, thornyheads, rockfish, cabezon, lingcod, and a variety of other nearshore species. Fixed gear catch is generally more homogeneous than trawlers, with only the target and a few bycatch species being caught on a set. Trips aboard fixed gear vessels range from one to ten days.

## Diversity of Fleet and Effects on Sampling

The fixed gear fleet on the West Coast is very diverse. Therefore, there are two manual sections devoted to sampling on fixed gear vessels: Chapter 5, “Fixed Gear Sampling” and Chapter 6, “Fixed Gear Sampling on Small Boats”. Observer sampling aboard all fixed gear vessels follows a consistent protocol. However, characteristics including vessel size, target fishery, and average landing weight affect observer sampling. Below is a list of characteristics that influence catch sampling. Under each

characteristic is an explanation of what is covered in Chapter 5, *Fixed Gear Sampling*, versus Chapter 6, *Fixed Gear Sampling on Small Boats*.

Fixed Gear Sampling	Fixed gear Sampling on Small Boats
Vessel size ranging from 35-70+ feet	Vessel size ranging from kayaks to 35 feet
Generally over 1500 lbs in a single delivery	Generally 50-500 lbs in a single delivery
Dead fish fishery	Live or dead fish fishery
Over 1500 hooks set in a day	Fewer total hooks fished
Large sections of gear retrieved in sets with discernible start and end points.	Small sections or pieces of gear set and retrieved repeatedly throughout the day.
Easily defined sets with start and end buoys	Sets are often determined by location, depth, and time
Conventional longline and strings of pots: <ul style="list-style-type: none"> <li>• Gear Types</li> <li>• 10 Fish Pot</li> <li>• 19 Longline (fixed hooks)</li> <li>• 20 Longline (snap-on hooks)</li> </ul>	Vertical longline (Portuguese set), stick, cable, troll, rod-and-reel, and individual pots or traps: <ul style="list-style-type: none"> <li>• Gear Types</li> <li>• 7 Vertical hook and line</li> <li>• 8 Pole</li> <li>• 9 Other hook and line gear</li> <li>• 10 Fish pot</li> <li>• 15 All troll gear</li> <li>• 16 All other miscellaneous gear</li> <li>• 19 Longline (fixed hooks)</li> <li>• 20 Longline (snap-on hooks)</li> </ul>

Fixed gear vessels range in size from kayaks to 70’.

Fixed gear vessels land between 50 lbs. and 10,000 lbs..per trip.

## Fixed Gear and Fishing Strategy Descriptions

Fixed gear types encountered on larger boats have the following WCGOP Gear Type Codes and each gear type is reviewed in the following section.

- 10 Fish pot
- 19 Longline (fixed hooks)
- 20 Longline (snap-on hooks)

### Gear Type 10 - Fish Pot

The words “pot” and “trap” are used interchangeably to mean baited cages set on the ocean floor to catch fish and shellfish. They can be circular, rectangular or conical in shape. The pots may be set out individually or as strings with multiple pots attached to a groundline. Larger vessels tend to set gear in strings of pots (Chapter 5, *Fixed Gear Sampling*) whereas smaller vessels often set traps individually (Chapter 6, *Fixed Gear Sampling on Small Boats*). All pots contain entry ports and escape ports that allow undersized or unwanted species to escape. Additionally, all pots must have biodegradable escape panels or fasteners that prevent the pot from continuing to fish if lost.

Strings of pots are marked at each end with a pole and flag, and sometimes a light or radar reflector. Individual pots are marked with surface buoys.

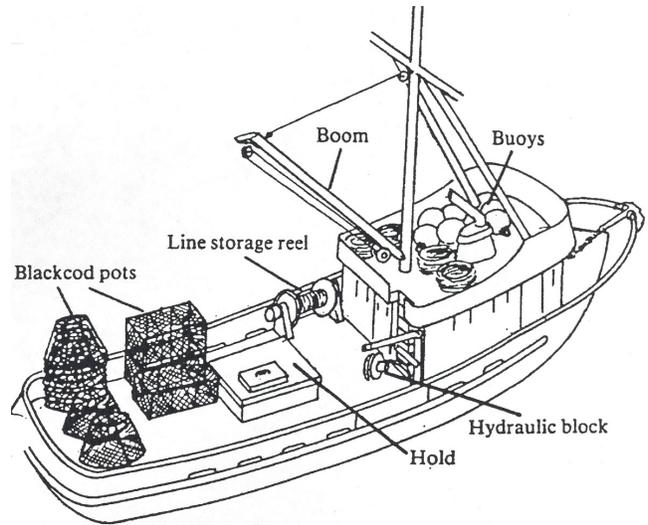


Figure 5-1: Trap Vessel

### Sablefish Pots

Sablefish pots are fished in strings weighted with anchors at each end and marked at the surface with buoys and flagpoles. The pots are rectangular, trapezoidal, basket, or cylindrical in shape and usually weigh less than 50 pounds (See Figure 5-2). Basket-shaped pots have collapsible bottoms so more pots can be stacked on deck. Pots are set and retrieved using line haulers, hydraulic blocks and overhead hoists. Pots are baited with squid, hake, or herring.

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Total number of hooks for the Trip Form equals the total number of hooks or pots for that set.

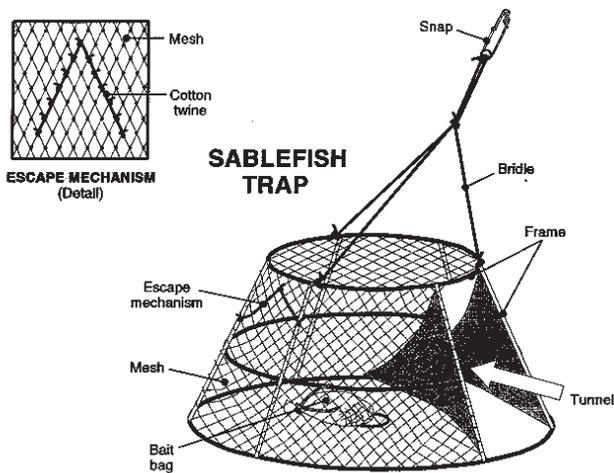


Figure 5-2: Sablefish Trap

### Gear Type 19 - Longline Gear (fixed hooks)

This gear type involves the setting out of a long horizontal line (**groundline/mainline**) to which other short lines (**gangions**) with baited hooks are attached. The groundline is secured between anchored lines and identified by floating surface buoys, bamboo poles, and flags. The groundline is laid along or just above the ocean floor (bottom longline) (See Figure 5-3).

Longline fishers usually further divide their gear into smaller segments in order to handle it aboard the vessel. A “set” consists of several segments of gear with the groundlines tied to one another. Segments of gear are usually referred to as skates or tubs.

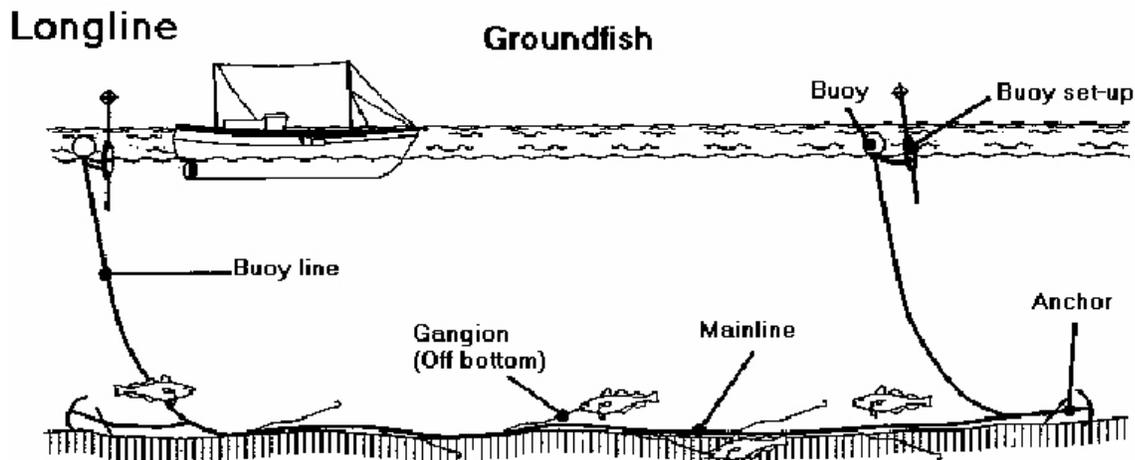


Figure 5-3: Longline Gear Set-Up

**Groundline/Mainline:** The length of line to which all of the hooks are attached. This line is the “backbone” of the longline gear.

**Gangion:** The length of line that connects the hook to the groundline. It is often one to two feet long.

**Skates/Tubs:** A segment of longline gear. Skates/tubs are tied together to form a set

To deploy longline gear, the vessel sets the first anchor and then steams ahead, following a selected pathway with the groundline and baited hooks being set off the stern of the boat. Hooks are usually baited by hand with squid, herring, octopus, or cod. Hooks of various sizes are attached to gangions of various lengths that are tied on or snapped onto the line at desired intervals. Hook size and spacing, depth, and soak time (fishing time) vary.

Longline gear is retrieved by pulling in the groundline and landing one gangion and hook at a time. On most longliners (See Figure 5-4), the vessel pulls the buoy aboard then pulls up the anchor using a **block**. The **rollerman** transfers the groundline to the block and begins hauling the groundline. The line comes in over the rollers, through the **crucifier**, over the block, and then is coiled. A rollerman stands at the railing of the vessel and helps the fish aboard. Some longliners on the West Coast manually pull the buoy, anchor and groundline aboard. Sablefish, Pacific halibut, spiny dogfish, and other groundfish are often targeted with longline gear.

### Gear Type 20 - Longline Gear (snap-on hooks)

Snap, or tube, gear is a variation on longline gear (See Figure 5-5). On snap gear, the gangions are “snapped” onto the groundline as it is being set and “tubes” refer to the garden hose gangions. The gangions are typically

garden hose “tubes”, but monofilament line and other types of line are used. Snap gear does not have skates, which is the most significant difference between it and conventional longline gear.

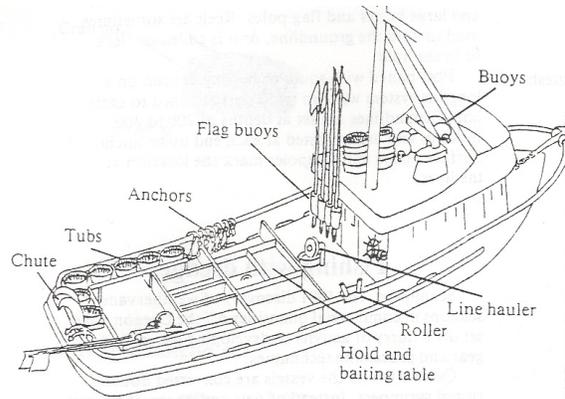


Figure 5-4: Longline Vessel

Boats that use this gear type typically have a large drum on the back of the vessel that carries all the groundline. They set just as conventional longliners but typically have a tub of baited gear on the stern and snap on the gangions as the mainline is being set

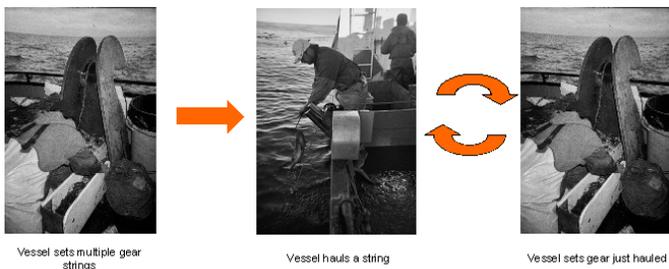


Figure 5-5: Examples of snap gear hooks.

**Block:** A hydraulically driven wheel into which the groundline is placed during gear retrieval. As the wheel spins the groundline is drawn aboard.

**Rollerman:** A crewman who stands where the fish are coming in and brings them aboard using a gaff. The rollerman lands any commercially valuable fish and excludes any non-commercially valuable fish from being landed

**Crucifier:** A pair of rollers or steel pegs which stand vertically with only enough room for the groundline to pass between. During gear retrieval, the groundline passes between the rollers and the hooks are pulled out of the fish.



**Figure 5-6: Operations of a Fixed Gear Vessel**

### Safety Concerns on Fixed Gear Vessels

There are several safety concerns on fixed gear vessels of which observers should be especially aware. Remember:

#### **Safety first!!**

It may be necessary to sample near the roller station or the block where moving hooks or pots pose a serious threat. It is not uncommon for crew members to be seriously injured by incoming and outgoing hooks or pots.

While aboard pot vessels, observers should be conscious of their surroundings at all times. Be aware of coils of line attaching the buoys to the pot. These are deployed as the pot is launched and have been known to wrap around ankles and drag crew overboard.

Decks are often awash with water, fish entrails, and whole fish, making them very slippery. In order to reduce the

risk of injury, always be conscious of dangers in the immediate area.

### Data Collection on Catch Share Fixed Gear Vessels

Vessels in the Trawl Catch Share program are allowed to switch from trawl gear to fixed gear to target certain species, such as sablefish. Although observers in the Trawl Catch Share program will primarily be sampling on trawl gear, it is important to know the sampling priorities and procedures on fixed gear.

Managers have the same data needs for fixed gear vessels as they do for trawl. The data flow for sampling fixed gear vessels is:

1. Defining a Set.
2. Determining Amount of Gear in a Set.
3. Tally Sampling.
4. Recording Catch, Species Composition, and Fishing Effort Information.
5. Collecting Biological Data.

**Tip:** Biological Data is collected on every haul if possible. Biological Data collection is described in detail in Chapter 7, *Biological Sampling* and Chapter 8, *Protected Resources*.

### On the Steam Out

There are a few pieces of information that should be learned prior to the first set or retrieval.

1. Ask the skipper how many hooks or pots the vessel will fish with during the trip. Also ask him how many sets are typically retrieved every day.
2. Determine the normal operational pattern. This will help determine a good sampling plan. Find out if the vessel haul-sets, haul-sets, haul-sets or hauls-hauls-hauls, sets-sets-sets.

**Tip:** On the steam out is a good time to conduct hook counts on the gear which is used to determine average hooks per skate or tub. A minimum of 1/5 of the total gear on board should have hook counts conducted.

## Defining a Set

Defining a set of conventional longline or pot gear is straightforward. A set begins at a buoy and ends at a buoy. The set includes all of the hooks or pots in between the two buoys.

Generally, conventional longline sets have thousands of hooks and span two or more miles. Pot sets range from 10 to 50 pots per string. All hooks or pots set together in a string, even those lost prior to retrieval, are considered a set and included.

## Determining Amount of Gear in a Set

In order to devise an appropriate sampling frame, you must determine the amount of gear in the set. There are two types of longline gear.

- The first type of gear has no divisible units, rather it is one long line with hooks. An example of this type of gear is **snap gear**.
- The second type is gear that can be divided into units, called skates or tubs. Vessels fishing with skate gear can vary how many hooks are fished in each set by increasing or decreasing the number of skates tied together.

Interview your captain to determine whether or not the gear is divisible into skates. Determining the number of hooks/pots in a set is dependent on the type of gear being used.

### Snap longline or other gear that is not divided into skates

To determine the number of hooks set, you will need to count all of the hooks in the set. The options for counting hooks, in order of preference, are:

1. Count hooks while they are being baited.
2. Count hooks while the gear is stored on the vessel.
3. Count hooks during gear deployment (the setting of gear).
4. Count hooks while gear is being retrieved on sampled hauls and ask skipper if any gear was lost. This can be extremely difficult, especially when you need to sample for species composition at the same time. Also, counting hooks in the evening, morning, and night can be difficult.

Terms often used when discussing sampling longline gear:

**Set:** Another word for haul.

**Skate:** A string of hooks that can be tied together to form a set.

**Tally count:** Also called tally sampling, which is counting all the retained and discarded fish with a hand clicker or slash marks in the raw data.

**Tally period:** A block of time when observer is tally counting retained and discard catch.

**NON- tally period:** A block of time where tally counting is suspended and fish are collected for actual weight data.

## Gear that is divided into skates

Determining the number of hooks set can be easier with this type of gear. There are two things you must determine:

- Number of hooks per skate.
- Number of skates in a set.

### *Number of hooks per skate:*

Vessels generally have a consistent number of hooks per skate. Always document in the Observer Logbook when hook counts were done and why that time was chosen.

- Count the number of hooks on a skate for at least 1/5 of the gear being used each trip. It is usually possible to count hooks while gear is being baited or set.

### *Number of skates in a set:*

Count the number of skates in a set:

- During deployment of gear.
- During retrieval of gear. If skate counts are done during retrieval of gear, ask skipper if any gear was lost. It can be difficult to count the number of skates during retrieval, as skate markers are sometimes hard to distinguish, especially at dawn and dusk.

If you cannot get an accurate count of the total number of skates set, ask the captain for an estimate. If you need to rely on the captain's estimate, a verification of skates per

set must be done once each day. This can be accomplished by counting skates during one of the following times:

- While gear is being set.
- After a set is completed and all gear is on board vessel.
- While gear is being retrieved.

### *Vessels Where Hook Counts Are Impossible*

There are a few vessels in Southern California and Port Orford fishing longline gear where it is impossible for observers to verify hook counts. The following circumstances combine to make counting hooks impossible:

1. All hooks must be tallied. This situation can occur for one of two reasons:
  - Single unit longline gear is being fished.
  - The skate knots marking the break between gear units are not readily discernible during gear retrieval.
2. Vessel is retaining live fish and discarding live fish so the observer must weigh fish quickly during the retrieval.
3. Gear is baited at an alternate location. Many fishers pay to have their gear baited. After a trip, they give their gear to the baiters who take it to a shop and bait it. When the gear is returned, it's ready to be set.

To determine the number of hooks per skate on these vessels:

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**Snap Gear** requires every hook be counted and tally sampled.

Document all hook counts in your logbook. Document in your logbook when hook counts were conducted and why. This is useful information for your debriefer when they are reviewing your data.

1. Ask the skipper after EACH skate/tub how many hooks were on that specific skate/tub.

**AND**

2. Ask the skipper after EACH haul how many hooks were hauled. This is a way to double-check that the skate counts are correct. If there is a large discrepancy between the count the skipper gave you for each skate/tub and the total count for the haul, interview the skipper further about why this discrepancy occurred. If the skippers estimates are used, the reason **MUST** be thoroughly documented in the Observer Logbook daily notes section. Notes should also indicate perceived accuracy of hook counts provided.

## Sampling Fixed Gear

Tally sampling (counting all the retained and discarded catch) on fixed gear vessels is conducted as the gear is being retrieved. When tallying on a line vessel, the observer counts every individual that comes up on the line, including drop-offs. When tallying on a pot vessel, the observer counts every individual in a pot. The observer has to determine if 100% of the gear can be tally sampled or if less than 100% of the gear can be tally sampled. If less than 100% of the gear is sampled, the tally sampling process can be divided into blocks of time, tally periods (when only tally counting of the catch is conducted) and non-tally periods (when sub-samples of discarded fish are weighed and other duties are completed

as needed).

## Duties and Priorities on Fixed Gear Vessels

1. Record incidental takes and collect appropriate biological information from protected species: marine mammals, sea turtles, seabirds, green sturgeon, and salmon.
2. Record interactions of marine mammals, sea turtles, and seabirds with fishing gear.
3. Record fishing effort information, including location, time, date, and depth for all hauls/sets.
4. Conduct hook counts per segment, or count all hooks.
5. Verify total segments per set.
6. Tally sample for species composition:
  - a. Tally sample 100% of the gear for species composition.
    - If this is not possible a minimum of 50% of the gear is to be tally sampled.
  - b. Count all retained and discarded fish by species, or species group.
  - c. Verify the number of segments, or hooks, in your sample.
  - d. Sample Pacific halibut:
    - Estimate the length of all PHLB (longline vessels).
    - Measure all PHLB and take viabilities (trap vessels).
  - e. Tally sample discards by discard reason.

- f. Obtain weights of fish:
- Target species: obtain an average weight subsample of at least 30 individuals
  - Bycatch species:
    - Weigh all individuals
    - If this is not possible, take a minimum subsample of at least 15 individuals for average weight.

7. Complete an IFQ Priority Species Tracking Form for every haul.

***Priorities 1- 7 must be completed on ALL hauls***

8. Record weight, length, sex, and take necessary dissections from tagged fish.
9. Complete species identification forms.
10. Maintain observer logbook.
11. Take biological samples, including length, sex, otoliths, tissue, etc. from discarded individuals.
12. Document sightings of ESA listed species.
13. Document sightings of non-ESA listed marine mammals and seabirds.
14. Enter data within 3 days of disembarking and complete all data forms.

**Determining the Amount of Gear to Sample**

*The most important thing to remember when tally sampling is to always tally the same number of hooks or pots for all retained and discarded species.*

1. Vessels that use snap gear or gear that is NOT divided into skates: 100% of the hooks in a set must be tallied sampled.
2. Vessels that use line gear that IS divided into skates or that use pots/traps: a minimum of 1/2 (50%) of the hooks/ pots in each set must be tallied sampled.

If less than 100% of a set is going to be sampled, a random sampling frame must be designed. There are two choices for designing a random sample frame:

- Systematic Spatial (preferred).
- Random (Non-systematic) Spatial.

Spatial sampling involves randomly selecting individual or groupings of skates to sample. Fixed-gear vessels routinely set over a depth gradient or across different bottom types. Therefore, the catch can vary significantly along a set. The best way to account for the variability caused by setting across a depth gradient or different bottom types is to use a systematic sampling frame. Examples of systematic and non-systematic spatial sampling follow:

**Step-by-Step Instructions for Systematic Spatial Sampling**

1. Determine the number of skates in the set.  
**Examples** A and B: 50 skates
2. Divide the number of skates in the set into equal units. This can be one skate or a grouping of skates (5 skates).

**Example A:** 50 units (1 skate = 1 unit)

**Example B:** 10 units (5 skates = 1 unit)

3. Number all sample units.

**Example A:** Number units 1 - 50.

**Example B:** Number units 1 - 10.

4. Determine how many of the sample units will be sampled (minimum 1/2 of set).

**Examples A:** Sample 1/2 of set = 25 skates.

**Example B:** Sample 1/2 of set = 5 units

5. Divide total number of sample units by the number of units that will be sampled. The outcome is considered “n” in the following steps.

**Example A:**  $50/25 = 2$

**Example B:**  $10/5 = 2$

6. Randomly select a number between 1 and “n”. This will be the first sample unit in your sample.

**Example A:** 1 randomly selected

**Example B:** 2 randomly selected

7. Sample every nth unit thereafter.

**Example A:** The following skates would be sampled: 1, 3, 5, 7, 9...49.

**Example B:** The following skates (sampling units) would be sampled: 6 - 10 (2), 16 - 20 (4), 26 - 30 (6), 36 - 40 (8), and 46 - 50 (10).

### Step-by-Step Instructions for Random Spatial Sampling

1. Determine the number of skates in the set.

**Examples A and B:** 100 skates

2. Divide the number of skates in the set into equal units. This can be one skate or a grouping of skates (5

skates).

**Example A:** 4 units (25 skates = 1 unit)

**Example B:** 10 units (10 skates = 1 unit)

3. Number all sample units.

**Example A:** Number units 1 - 4.

**Example B:** Number units 1 - 10.

4. Determine how many of the sample units will be sampled (minimum of 1/2 of set).

**Examples A:** Sample 2/3 of set = 3 units.

**Example B:** Sample 2/3 of set = 7 units

5. Randomly select numbers between 1 and the maximum sample unit. These will be the skates you will include in your sample.

**Example A:** select 3 numbers between 1 and 4: 1, 2, 3. Sample the selected skates: 1-25 (1), 26-50 (2), 51-75 (3).

**Example B:** select 7 numbers between 1 and 10: 1, 2, 5, 8, 9, and 10 randomly selected. Sample the following skates: 1-10 (1), 11-20 (2), 41-50 (5), 71-80 (8), 81-90 (9), 91-100 (10).

**Tip:** Always tally the same number if gear units for retained and discarded species. For example, do not tally half of a set for retained species and the whole set for discarded species.

### General Instructions for Tally Sampling

1. Determine the amount of gear to tally sample.
  - As discussed in the prior section, either 100% of the gear will be sampled or less than 100% of the gear will be sampled. If less than 100% of the gear is sampled, retained and discarded fish will be counted during the randomly selected tally periods. No counts are taken during the non-tally period.

2. Collect the equipment needed to tally sample:
  - A clipboard and pencil, three to six hand counters, and a Fixed Gear Catch Form. The tally sample raw data is documented on the back of the Fixed Gear Catch Form. The next section will discuss how to document tally samples.
3. Place two or more observer baskets next to the rollerman for discarded species to be thrown in.
  - Be aware of vessel space constraints. These discarded fish will be weighed by the observer and used for the average weight calculations.
4. Find a location on deck to tally sample, which is known as the “tally station”.
  - The tally station should be no more than six meters from where the fish are brought aboard and have a clear line of sight. From the tally station, observers must be able to clearly identify fish to species as they come aboard and see drop-offs and individuals preyed upon. Discuss your needs with the crew and work with them to determine the best location that is a safe distance from where the gear is hauled aboard and that reduces interference with the crew as much as possible.
5. Count each individual that comes up on the line or in the pot during the randomly selected tally periods.

**Tip:** An actual count of individuals is required for all fixed gear data.

### Tips for Documenting Tally Samples

- The back of the Fixed Gear Catch Form is divided into two sections, **Retained** and **Discarded**. Write down species names that are likely to be caught down the middle of the form.

**Tip:** See examples of how to document tally sampling in the raw data on Trip Examples at the end of the chapter and See Figure 5-7 and Figure 5-8.

- **Drop-offs and Predation of retained species:** While tally sampling, some fish that would have been retained drop off the line or are preyed upon and discarded. These discarded fish, which would have been retained, should be documented in the raw data as such. Be prepared by creating an area on the deck form to document all drop-offs and individuals preyed upon for the retained target species (See Figure 5-7).
- **Small individuals of retained species:** While tally sampling, some fish that would have been retained are considered too small by the vessel to keep and are discarded. These discarded fish, which would have been retained, should be documented in the raw data as such. Create a space on the back of the Fixed Gear Catch Form to document “smalls” of the retained target species (See Figure 5-7).
- **Pacific halibut:** Actual weights cannot be obtained from Pacific halibut due to their large size and because vessels often don't bring them aboard. Observers must make a visual estimate of PHLB length in centimeters onboard longline vessels or take actual lengths on pot vessels. On longline vessels, be prepared by creating an area on the deck form to document PHLB visual lengths and clearly indicate its a visual estimate (See Figure 5-7). This will allow for a quick documentation of PHLB while tally sampling. If an actual length measurement of all Pacific halibut is obtained, designate an area of the form to document this data and clearly indicate its an actual length.

**Tip:** See examples of how to document tally sampling in the raw data on Trip Examples at the end of the chapter and see Figure 5-7 and Figure 5-8.

- **Species similar in appearance:** Some species, such as Shortraker and Rougheye rockfish and Shortspine and Longspine rockfish, are similar in appearance and cannot be distinguished unless they are examined closely in the observer’s hand. Tally count them as a mixed group naming them “Rougheye/Shortraker” or “Shortspine/Longspine”.

Set #	Date	Time	Latitude		Longitude		Depth (m)	Gear
			Degrees	Minutes	Degrees	Minutes		
Start								
End								
Start								
End								

Gear Units Sampled: \_\_\_\_\_ Average Soak Time/Gear Unit: \_\_\_\_\_ # hooks/gear unit: \_\_\_\_\_  
 Retained: \_\_\_\_\_ Tally Sample: \_\_\_\_\_ Discarded: \_\_\_\_\_

**Figure 5-7: Example of Fixed Gear Catch Form Before Sampling with commonly used labels written in.**

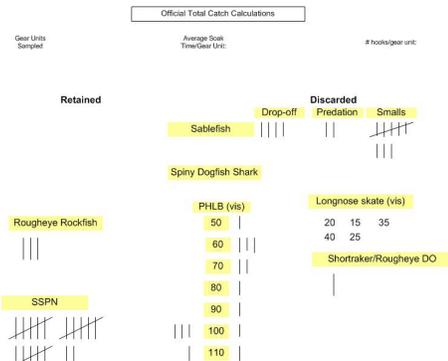
During each tally sampling period, count each species that comes up on the line or in the pot by disposition (retained versus discarded). Species that are caught in small numbers can be accounted for by placing hatch marks in the raw data next to their common names. For species that are caught in large quantities, use a hand counter to keep track of fish counts and write these

Species that are known to be retained by the vessel will have some fish that are discarded. Tally sample these separately in the raw data:

**Drop-off:** Fish that fall off the line as they leave the water line. These individuals do not make it aboard the vessel.

**Predation:** Fish that have been damaged by whales, sand fleas, hagfish, lingcod or other animals.

counts in the raw data labeled with the word “tally” next to their common name.



**Figure 5-8: Example of raw data on fixed gear vessel for species similar in appearance.**

## Collecting Weights

During each set/haul, the observer is responsible for counting each individual that is on the line or in the pot (i.e.. tally sampling) and collecting weights for each fish species. During each set/haul the observer sometimes will be able to collect weights for 100% of the catch and sometimes will be able to collect weights for LESS than 100% of the catch. The methods for determining weights on fixed gear vessels are listed below in order of preference:

1. Weigh individuals from within the same set.
2. Use weights collected from another “like” set.

3. Visually estimate weight of individuals.
4. PHLB Length/Weight Conversion (only for Pacific Halibut)

**Tip:** Weight estimates for drop-offs and fish affected by predation are based on the average weight for retained individuals of the same species.

### *Weights from individuals within the same set*

Whether or not you'll be able to weigh all individuals in the set depends on the quantity and diversity of the catch, which is influenced by gear type, depth, and location of fishing. Pot vessels tend to have little bycatch diversity and there are few individuals. Longline vessels tend to have more bycatch diversity, and it can occur in high numbers.

In general, observers on pot vessels are able to collect and weigh all bycatch species. If the catch rate is low, you may also be able to weigh all of the target species. On longline vessels observers typically take subsamples for average weight since it is not possible to weigh all of the individuals and tally sample at the same time.

If you are not able to weigh all individuals, collect a subsample for average weights. At a minimum collect:

- 30 individuals from the target species
- 15 individuals from non-target species

Individuals can be collected to weigh during a tally

sampling period or during the non tally periods.

- **During tally period:** The preferred method for discarded species and non-target retained species is to collect individuals during the tally period. When individuals are collected during the tally period, it ensures that all species in the sample are present.
- **During non-tally period:** Target species are often collected during the non-tally period due to space limitations and/or time constraints. Be aware: If non-target individuals are collected only during the non-tally period, all species that occur in the tally sample may not be present.

**Tip:** Fish carcasses or skeletons should not be weighed. These fish are tallied as fish discarded due to predation. Use the average weight derived for the species from whole specimens

### *Actual Weights from "Like" Sets*

There may be one or more species for which it was not possible to collect individuals to determine average weight of the species. This usually happens if only a few individuals of a given species are caught. If this occurs, use the weight of the same species from a similar haul.

### *Visually Estimated Weights of Large Organisms and Discarded Catch*

It may be necessary to visually estimate the weight of large organisms and some discarded species.

Like sets are:

1. Close in proximity
2. In same depth range
3. Similar in soak time
4. Targeting the same species

Large organisms, such as sharks and skates, often fall off the line prior to being brought aboard or are too large/awkward to handle. Visually estimate the weight of each individual by species while tally sampling.

If a species that would not have been retained drops-off the line, is deteriorated due to predation, or if no individuals of a species is collected for weights on the set or on previous sets, then visually estimate its weight while tally sampling.

### ***Pacific Halibut***

Pacific halibut caught on longline vessels are often too large to obtain an accurate weight with the scales provided, and large individuals may not be brought on board the vessel at all. To obtain weights for P. Halibut aboard longline vessels in the Catch Share program, observers will visually estimate the length of each P. Halibut in the sample. The IPHC has developed a length-to-weight table that lists approximate weights of Pacific halibut based on the length in centimeters (see Appendix M: Pacific halibut Length/Weight Table). Any P. halibut caught on pot vessels will be landed and can be measured using an actual length.

The following suggestions will help with estimating the length of Pacific halibut on longline vessels:

- Measure the distance from the roller to weld marks on the side of the vessel or the waterline, if weather permits.
- Measure the distance between the gangions on the groundline and measure the length of the gangions themselves. On most longline vessels, the distance between the gangions and the length of the gangions are consistent. During normal operations, the observer will be able to see the fish being pulled by the groundline and gangion. Estimate the length of the Pacific halibut in reference to the length of groundline between the gangions or the length of the gangion itself.
- Use the length of the gaff or the pole gaff to compare to the lengths of the Pacific halibut.
- Pre-measure the length of the longline trough. Some Pacific halibut will be brought on board by accident. Having several marked measurements in the trough will allow the observer to quickly estimate the length of any landed Pacific halibut.

### **Random Sampling for Collecting Average Weights**

There are two methods used to randomly collect individuals. These two methods, random spatial and systematic sampling, are detailed below.

#### ***Random Spatial Sampling***

Spatial sampling is a good method to use for species caught in small quantities.

1. Select gear segments to use for collecting individuals using one of the following two methods:
    - Select all non-tally-sampled gear segments.
    - Randomly select one or more gear segments from the entire set.
  2. Collect all individuals.
  3. Weigh and count the collected individuals to determine average weights.
2. Systematically collect a portion of the total number of individuals.
    - Estimate the total number of individuals that will be caught while individuals are being collected for weights.
    - Divide the estimated total individuals by the number of fish needed (at least 15) to determine the collection frequency (n).
    - Collect every nth individual beginning with a randomly chosen starting point.
  3. Weigh and count the collected individuals to determine the average weight.

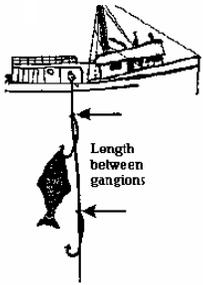
#### ***Example of Random Spatial Sampling***

1. The Blue Dragon sets 20 pots.
2. The observer on the Blue Dragon randomly selects 13 of the 20 pots to tally sample by pulling numbers out of a hat.
3. The observer uses the remaining 7 pots to collect and weigh individuals for average weight determinations.

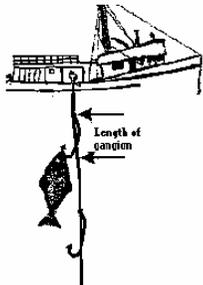
#### ***Systematic Sampling***

Systematic sampling is a good method to use for species caught in large quantities and in live fish fisheries.

1. Select gear segments to use for collecting individuals for average weights using one of the following methods:
    - Select all non-tally-sampled gear segments.
    - Randomly select one or more gear segments from the entire set.
    - Sample throughout entire set. (If 100% of the gear was tally-sampled, then sampling throughout the entire set is recommended.)
-



Estimating halibut length using distance between gangions



Estimating halibut length using length of gangion

### Example of Systematic Sampling

1. The Miss Fish sets a longline with 10 skates.
2. The observer randomly selects skate 2 for obtaining the average weight of sablefish by selecting a number from a random number table.
3. The observer estimates that 250 sablefish will be caught in skate 2.
4. The observer wants to collect 30 sablefish to use for an average weight determination.
5. The observer determines the frequency to collect sablefish by dividing 250 by 30 to get a collection frequency of 8.
6. The observer randomly chooses a number between 1 and 8 from a random number table and gets the number 4. Starting at the beginning of skate 2, the observer collects the 4th fish and then every 8th sablefish after (12, 20, 28, etc.) until the end of skate 2 is reached.
7. The observer weighs all the sablefish collected in skate 2.

## Documenting Tally Samples

The tally sample is normally documented on the back of the Fixed Gear Catch Form (See Figure 5-9: Tally Sample Example on page 24), along with the weights of individuals of each species weighed. Once sampling for the haul is complete, the Catch Form and Species Composition Forms can be completed.

### Catch Categories on Fixed Gear Vessels

As a review, there are two rules that apply to catch categories:

- Retained and discarded individuals are always in separate catch categories.
- Individuals are grouped in the same catch category when they are sampled together. All individuals in the catch category must have the same weight method and sample method. Typically, it is only when a visual estimate or *P. halibut* length/ weight conversion is used to determine weight that a species is not grouped with a retained or discarded catch category.

### Grouping, Assigning Weight Methods, and Naming Catch Categories on Fixed Gear Vessels

On fixed gear vessels, catch category grouping depends upon the method used to obtain the weight of the species (actual weight, visual estimate, fish ticket, etc.).

Official Total Catch Calculations				
Gear Units Sampled	15	Average Soak Time/Gear Unit:	N/A	# hooks/gear unit: 136
<b>Retained</b>		<b>Discarded</b>		
7 @ 57.82 lbs				
8 @ 71.96 lbs				
10 @ 86.91 lbs				
6 @ 53.84 lbs	562	Sable		(Drop-off)
8 @ 61.43 lbs				
8 @ 72.34 lbs				
7 @ 52.16 lbs				
		Arrowtooth		15 @ 77.0lbs (Market)
		Starfish		11 @ 10.23 lbs
14 @ 55.0		Red-Banded		(Drop-off)
		Spiny Dog		51
				15 @ 60.74 lbs (Market)
2 @ 5.5lbs		Shortspine		(Drop-off)
		Skate (Visual)	40 30 20 60 20 50 40 45 30 40 20 30	(Market)
		P. halibut (visual length)	30 JHT 40 JHT JHT II 50 II 60 I 80 JHT JHT JHT I 100 III 110 II	
Total Hooks in Set = 15 skates X 136 Hooks Skate = 2040 Hooks				
OTC = Retained + Discarded = 4813.82 lbs + 359.74 lbs + 406.87 lbs + 425 lbs = 6005.43 lbs				

**Figure 5-9: Tally Sample Example**

- All species whose weight was determined by an actual, or average, weight from the same set or from “like” sets, should be grouped in the same catch category by disposition (retained and discarded). On the Fixed Gear Catch Form, these catch categories will have Weight Method 13 - Tally Sample.
  - As these catch categories will have a species composition sample, the name of the catch category is irrelevant. ZMIS is most commonly used.
- Species whose weight was determined by a visual estimate should be placed in their own catch categories. On the Fixed Gear Catch Form, these catch categories will have **Weight Method 14 - Visual**

### Experience.

- As these catch categories will not have a species composition sample, the most descriptive catch category code possible should be used. To determine catch category code, in order of preference, use:
    - Species specific code (i.e. ARRA, Aurora rockfish)
    - Species grouping code (i.e. SKAT, Skates and Rays)
    - INVT: invertebrate discard.
    - MBOT: miscellaneous bottom items, including rocks, mud, logs, bones, garbage, etc.
    - ZMIS: Mixed catch which can include fish species, invertebrates, and bottom items (like rocks, logs, etc.). For unsampled catch categories, ZMIS should only be used when a more specific name is not available.
- Pacific halibut whose weight is determined using the length-to-weight table should be placed in its own catch category, by disposition. The catch category weight method on the Fixed Gear Catch Form will be **WM-9 P. Halibut Length/Weight Conversion or 19 - P. Halibut Length/ Weight Extrapolation**. These weight methods are used when lengths are visually estimated OR actually lengthed and the weights are calculated using the IPHC Pacific halibut Length/Weight conversion table.
    - As these catch categories will not have a species composition sample, the most descriptive catch category code, **PHLB**, should be used.
    - The visually estimated lengths will be documented on the Length Frequency form using sample method 10 -P. Halibut visual length estimate. The

actual lengths taken will be documented on the Biospecimen form.

4. All retained species whose weight was determined by fish ticket weights should be grouped in a single catch category. On the Fixed Gear Catch Form, these catch categories will have **Weight Method 13 - Tally Sample**.
  - As these catch categories will have a species composition sample, the name of the catch category is irrelevant. ZMIS is most commonly used.

### Fixed Gear Catch Form Instructions

The Fixed Gear Catch Form (See Figure 5-10) is used to document Catch Categories, Sample weights, and other catch information. A Catch Form should be completed for all hauls.

**Tip:** The “Sample Weight” column on the Fixed Gear Catch Form is filled out differently than the “Catch Weight” column on the Trawl/ Prawn Catch Form. For Fixed Gear, the weights recorded are sample weights; for Trawl, the weights represent total weight estimates for the catch category.

- **Haul Number:** Record the number of the haul.
- **Page \_ of \_:** Number forms sequentially with in each haul. Haul forms (Catch, Species Composition, Length Frequency, and Biospecimen) are numbered consecutively, separate from Trip forms.
- **Date:** Record the date as MM/DD/YY.
- **Trip Number:** This number is automatically generated by the database. Complete this field once the trip has been started in the database.

- **USCG number:** Record the USCG vessel number posted on the exterior of the vessel or request this six or seven digit number from the vessel skipper or a coordinator. If the vessel does not have a USCG number, leave field blank.
- **Catch number:** Number the catch categories consecutively, starting from 1 for each haul. The numbers on the paper Catch Form must match the numbers assigned by the database when data is entered.
- **R or D:** Record whether the catch category is R – Retained or D – Discarded.
- **Catch category:** Record each catch category, in capital letters, using the 3 or 4-letter PacFin code. For a list of PacFin catch category codes, see Appendix F.
- **Sample weight:** Record the sample weight of the tally sample in pounds.

**Tip:** The “Sample Weight” field should not be filled in for catch categories with weight method 13- Tally Sample until after the Species Composition form is completed. At this stage, only complete the “Sample Weight” column for catch categories with weight methods 9 or 14.

**Tip:** If there is a species composition sample for the catch category, the Sample Weight should be the same as the Key punch Weight on the Species Composition Form! (If not, there is a problem.)

- **# of fish:** The total number of fish in the catch category must be documented for the following weight methods: 14 - Visual Experience (if actual number); 9 - P. Halibut Length/Weight conversion or Weight method 19- P. Halibut Length/Weight conversion extrapolation.

**Tip:** Do not record the number of fish for weight method 13 - Tally Sample; these are recorded on the species composition form.

- **Hooks/Pots sampled:** Record the number of hooks or pots that were tally sampled.
- **Weight method:** Document the weight method used to estimate the sample weight for each catch category.

- 6 Other
- 9 Pacific halibut length/weight conversion
- 13 Tally sample
- 14 Visual experience
- 19 Pacific halibut length/ weight extrapolation

- **Catch purity:** If catch category was sampled for species composition, record M- Mixed if more than one species was within sample. Record P - Pure if there was only one species in species composition sample.

If the catch category was not sampled, record as P – Pure if the catch category is composed of 95% or greater a single species or as M – Mixed if the catch category is composed of less than 95% a single species.

- **Discard Reason:** Record the skipper/crew's discard reason for discarded catch categories for Weight Method 9 - PHLB Length/Weight Conversion and Weight Method 14 - Visual Experience. Whenever a catch category does not have an associated species composition sample, discard reason must be documented on the catch form.

- 11 Incidental/Accidental
- 12 Drop-off
- 13 Market
- 14 Other
- 15 Predation

- 16 Regulation
- 17 Safety
- 18 Market (dockside only)

**Tip:** Look only at the primary reason for discard. For instance, if the vessel is not retaining P. hake and one drops-off, do not record the reason for discard as drop-off. Even if it had made it on the vessel, the fish would not have been retained. This also applies to fish preyed upon that drop-off. If a fish that would have been retained drops off because it's been preyed upon, the reason for discard should be predation (even if the fish made it aboard it would not have been retained due to predation)

- **Comments:** Document anything important about each catch category. Species names should be recorded here if catch category is not accompanied by a species composition sample and catch category name does not indicate species. For example, NIFQ, INVT, MBOT and OSRK.
- **Keypunch checks:** These are required fields for Sample Weight, # of Fish, and # of Hooks/ Pots sampled by catch category columns. Sum up the entries in each column and place the total in the corresponding keypunch box at the bottom of the form.



## Completing the Species Composition Form

In order to complete the Species Composition Form, the total weight of each species in the tally sample needs to be determined. Average weight calculation will need to be done for species whose weight was determined by:

1. A random subsample of all individuals caught were weighed (all individuals of species not weighed).
2. Fish ticket weights use for retained species AND trip had more than one haul.\*

### Sample Methods on Fixed Gear Vessels

There are three sample methods that describe species composition sampling on fixed gear vessels. Remember, only catch categories with weight method 13 - Tally sample will have species composition samples. Refer to the section titled Fixed Gear Complications for instructions on using fish ticket weights.

#### *Sample Method 4 – Fixed Gear Sample*

Used for species whose weight is determined by actual weight from individuals in the same set or in “like” sets.

**Tip:** It is not necessary to place a species whose weight is extrapolated in a different catch category than species where each individual was weighed. They should ALWAYS be in the same catch category

**Tip:** If an average weight from like “set(s)” is used, be sure to document in raw data the haul number(s) that were used

#### *Sample Method 5 - Fixed Gear Fish Ticket Verified\**

#### *Sample Method 6 - Fixed Gear Fish Ticket Unverified\**

\* See Fixed Gear Complications section

### Species Composition Form Instructions

Species composition information is recorded on the Species Composition Form (See Figure 5-12).

- **Haul number:** Record the number of the haul that the sample came from.
- **Page \_ of \_:** Number forms sequentially with in each haul. Haul forms (Catch, Species Composition, Length Frequency, and Biospecimen) are numbered consecutively, separate from Trip forms.
- **Date:** Record the date as MM/DD/YY.
- **Trip Number:** This number is automatically generated by the database. Complete this field once the trip has been started in the database.
- **Fit number/Calibration weight:** If these data were documented on the back of the Fixed Gear Catch Form, leave this field blank. Record the Fit number from your marine calibration followed by the displayed weight of your 5KG test weight in pounds on every haul. This field will not be entered into the database
- **Trawl Biosampling List:** Leave this field blank on fixed gear vessels. The same list, either Nearshore or

Non-Nearshore Fixed Gear, will be used for all hauls.

- **Catch number:** Record the number that corresponds to the catch category on the Catch Form.
- **Catch category:** Record each catch category, in capital letters, using the 3 or 4-letter PacFin code. For a list of PacFin catch category codes, see Appendix F.
- **Sample method:** Record the method used to sample the catch category.
  - 4 Fixed gear
  - 5 Fixed gear - fish ticket verified
  - 6 Fixed gear - fish ticket unverified
- **KP Weight and KP Number:** Sum up the total weight of all species in the catch category sample and place the total weight in the Keypunch (KP) Weight box. Sum up the total number of all individuals in the catch category sample and place the total number in the Keypunch (KP) Number box.

**Tip:** Check to be sure the KP Weight on the Species Composition Form is the same as the Catch Category Sample Weight on the Catch Form! (If not, there is a problem).

- **Species:** Record the common name of each species in the sample. This column must be filled in with the species name. Do not simply enter the species code! The common name listed on the paperwork must match the common name used in the database. Species specific PacFin codes are acceptable (e.g. DSRK, ARTH).
- **Species code:** Record the species code of the corresponding species. It is not necessary to complete this field while on deck. For a list of all species codes see Appendix A-E.

- **Sample Weight:** Record the total weight of the species in the sample (can be extrapolated).
- **Fish Number:** Record the number of fish of each species in the sample (can NOT be extrapolated).
- **Discard Reason:** Record the skipper's/crew's reason for discard for each discarded species (refer to Chapter 3 "Observer Basics" for more information on these codes.

- 11 Incidental/Accidental
- 12 Drop-off
- 13 Market
- 14 Other
- 15 Predation
- 16 Regulation
- 17 Safety
- 18 Market (dockside only)

**Tip:** Look only at the primary reason for discard. For instance, if the vessel is not retaining P. Hake and one drops-off, do not record the reason for discard as drop-off. Even if it had made it on the vessel, the fish would not have been retained. This also applies to fish preyed upon that also drop-off. If a fish that would have been retained drops off because it's been preyed upon, the reason for discard should be predation (even if the fish made it aboard it would not have been retained due to predation)

- **Release method:** This column is documented in the Nearshore fishery only. See Chapter 6, "Fixed Gear Sampling on Small Boats".
- **Basket Weight and Number:** Use these columns on deck to document numbers and weights. These columns are not commonly used for fixed gear data. Tally sample raw data is usually recorded on the back of the Catch Form.



unsampled (lost) gear. An extrapolation for lost gear is made when a gear segment, such as a skate of hooks or trap is lost, but NOT when individual hooks break off.

### Weight Method 11 - Retained + Discarded

This method is used when 100% of the gear is tally sampled. The total # of gear segments units set will equal the # of gear segments/ units sampled.

#### Calculation

$$OTC = \sum \text{All Catch Categories on Catch Form}$$

## Recording Fishing Effort Information and Total Catch Estimates

Fishing effort information must be recorded for every set a vessel makes while the observer is on board. The fishing effort information is recorded on the Trip Form.

### Seabird Avoidance Gear

Vessels that fish with hook and line gear often have seabirds following the vessel, attacking hooks as they are set. In order to prevent bait from being stolen and birds from dying, some vessels use a seabird avoidance device while setting their gear. Common types of seabird avoidance gear include:

WCGOP seabird avoidance gear codes are:

- 0 No
- 2 Streamer line(s)
- 3 Buoy line
- 4 Weights
- 5 Night setting (exclusively)
- 6 Other (describe in haul comments)

Common types of seabird avoidance gear include:

#### 2-Streamer/Tory Lines (Single and Paired)

Streamer/tory lines consist of a length of line, streamers (smaller pieces of line) attached along a portion of the length, and one or more floats at the terminal end. Paired streamer lines consist of two streamer lines, one deployed on each side of the main groundline.

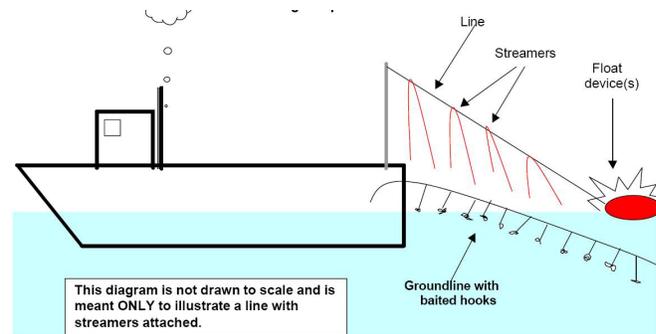


Figure 5-12: Streamer Line Diagram

3 - *Buoy Bag Line*: A buoy bag line consists of a length of line (no streamers attached) and one or more float devices at the terminal end.

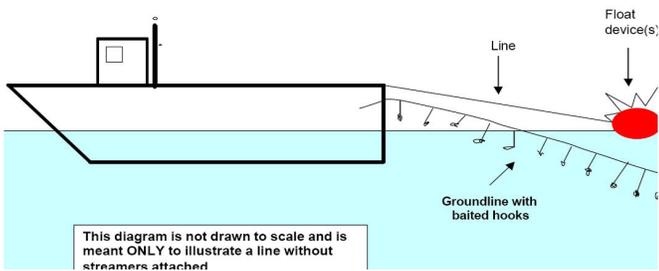


Figure 5-13: Buoy Line Diagram

**4 - Weights:** Crew adds extra weights to the groundline for the purpose of sinking gear more quickly.

**5 - Night Setting (exclusively):** The vessel sets at night to avoid seabird bycatch.

**6 - Other:** Vessel uses a different method to avoid/reduce seabird bycatch. Describe method used in observer logbook and in haul comments.

### Trip Form Instructions

A Trip Form must be completed for all observed trips. (See Figure 5-15)

- **Fishery Sector** (along top right hand border): Circle the fishery type the vessel participated in. Catch share observers will always circle CS. (CS = Catch Share, LE = Limited Entry, OA = Open Access, or **EFP** = Exempted/Experimental Fishing Permit).
- **Page number:** All Trip Forms are numbered together by trip and separate from all other forms. If there are

five trip forms on one trip, number them 1/5 through 5/5.

- **Trip number:** This is an automatically generated number by the database. Complete this field once the trip has been started in the database.
- **USCG number:** Record the six or seven digit USCG vessel number posted on the exterior of the vessel or found in the database. *If the vessel does not have a USCG number, leave field blank and fill in the State Registration Number field.*
- **State registration number:** Use this field only if the vessel does not have a USCG number. The state registration number will begin with a CF in California, OR in Oregon, and WN in Washington.
- **Observer name:** Record your first and last name.
- **Year:** Fill in with appropriate year.
- **Vessel name:** Record the full name of the vessel as it appears on the vessel. For example, record Capt John, not Captain John.
- **Partial trips:** This is a Non Catch Share field only. Leave this field blank.
- **Fishery:** Record the name of the fishery the vessel was selected for: Catch Share, Mothership Catcher-Vessel, or Shoreside Hake.
- **Vessel logbook name:** Record the name of the logbook the vessel is using to record fishing effort information. The following logbook can be used:

Fishery	Vessel Logbook Name
Catch Share	WOC Trawl Logbook

- **Permit number:** Document, the permit number being used. Catch Share vessels use at least one

**EFP:** Permits that allow fishing activities that would otherwise be prohibited. The permits are usually written by the states and must pass a vote by the PFMC

groundfish permit which starts with GF, in capital letters, and is followed by 4 digits, all with no spaces. For example: GF0432. Permit numbers should be acquired by asking the captain of the vessel or can be looked up at: <http://www.nwr.noaa.gov/Groundfish-Halibut/Groundfish-Permits/index.cfm>

- **Vessel logbook page number:** The Vessel Logbook number is the page number(s) where the skipper is recording the trip information. Do not record the number of the entire logbook! Logbook page numbers are located in the bottom left corner of the Washington-Oregon-California logbook. If multiple page numbers were used during a trip, enter only the first page number into the database field. Enter additional page numbers into the trip notes section of the database.

Vessel Logbook Name	Page Number Location
WOC Groundfish Logbook	Bottom left corner (See Figure 4-8)

- **Receiver (Catch Share Only):** Document the name of the person or plant that the vessel delivered to. If there is more than one receiver, document only the initial first receiver here. Additional receivers should be documented in the trip notes
- **Observer logbook number:** Record the number on the front page of the Observer Logbook used to document information about the trip.
- **Skipper's name:** Record the first and last name of the skipper. If your skipper is not in the database, contact your debriefer to have it added.
- **Number of crew (including captain):** Document the number of crew on the vessel. This should include the

skipper, but not yourself.

- **Departure date/time:** Document the date and time the vessel left port. Date must be documented as MM/DD/YYYY. Time must be documented using military time (e.g. 1400).
- **Return date/time:** Document the date and time the vessel returns to port. Date must be documented as MM/DD/YYYY. Time must be documented using military time (e.g. 1400).
- **Departure port:** Document the port the vessel departs from.
- **Landing port:** Document the port the vessel returns to.
- **Fish ticket number(s):** Obtain the numbers of all landing receipts (fish tickets) from the vessel skipper, the port biologist, or the fish plant. This is a required field for all fisheries and trips!
  - CA fish tickets begin with a letter followed by six digits.
  - OR fish tickets are seven digits.
  - WA fish tickets begin with a letter followed by six digits.
- **WOC:** The state agency code is: C - for California deliveries, O - for Oregon deliveries, or W - for Washington deliveries.
 

**Tip:** always confirm that you have received all fish ticket information for each trip. Plants often record landings from a single trip on more than one fish ticket.
- **Date:** Document the date in MM/DD/YY that is recorded on the fish ticket.

## Haul Information Instructions

- **Haul/Set Number:** Number hauls consecutively, starting with one for each trip.

**Tip: Hauls must be numbered in the order retrieved!** If hauls are numbered in the order they were set, all Catch, Species Composition, and Trip Information will need to be renumbered at debriefing.

- **Observer Total Catch Estimate (OTC):** Record the total catch estimate to two decimal places. Observer Total Catch estimate is recorded in pounds.
- **Weight method:** Enter the number that represents the weight method used to obtain the observer total catch estimate. The weight methods that may be used for fixed gear OTCs are:

- 6 Other
- 8 Extrapolation
- 11 Retained + Discard

- **Total hooks/pots:** Record the total number of hooks or pots in the set. This number should include lost gear.

**Tip:** Use Weight Method 8-extrapolation when gear is lost or less than 100% is tallied; use weight method 11-Retained + Discard when 100% of the gear is tallied.

- **Gear performance:** Record one of the following codes to document gear performance:

- 1 No problem
- 2 Pot was in haul
- 3 Net hung up
- 4 Net ripped
- 5 Trawl net or codend lost, pot(s) lost, other gear lost
- 7 Other problem. Document other gear-related

problem(s) in the comments section.

**Tip:** If line parts but all gear is retrieved, use 1-No Problem and put a note in comments

- **Seabird Avoidance Gear (Gear types 7, 9, 19, & 20 only)-** Document the number that describes the type of seabird avoidance gear used or document “0” (No) if not used. Note: only document gear that was used specifically to prevent bait from being stolen and birds from dying.

- 0 No
- 2 Streamer line(s)
- 3 Buoy line
- 4 Weights
- 5 Night setting (exclusively)
- 6 Other (describe in haul comments)

- **Avg. soak time:** If set was not defined by buoy to buoy and gear type is not pole, document the average range of soak time of a single unit of gear. (Gear types 7 and 9; Gear type 10 sometimes (if pots are not attached to a groundline); Not used for gear types 19 and 20 (defined by bouy to bouy)).

- < 1 minute
- 1 to 5 minutes
- 5 to 15 minutes
- 15 to 30 minutes
- 30 to 45 minutes
- 45 to 60 minutes
- 60+ minutes
- 1-2 hours
- 6 hours
- 12 hours
- 24 hours
- 36+ hours

---

**Q:** Why are observers required to record Fish Ticket Numbers?

**A:** When observer data is analyzed, the total landed weight from the Fish Ticket is used to estimate the amount of discard by species per landed weight of target(s).



## Trip Form – Haul Locations

**Tip:** Fixed gear vessels are not required to use a logbook so observers are often required to record haul location information on their own. (See Figure 5-17)

- **Trip notes:** Document any information pertinent to understanding the trip. For Catch Share trips document additional First Receivers.
- **Haul/set number:** Number hauls consecutively, starting with one for each trip.
- **Start date:** Document the date the haul was set as MM/DD.
- **End date:** Document the date the haul was retrieved as MM/DD.
- **Start time:** Document the Pacific Standard Time (PST) when the first hooks were put into the water for the start time.

**Tip:** Fixed gear can be set prior to the beginning of the trip. Record start time when the gear was set, not the start of retrieval.

- **End time:** Document the time when the last hook or pot is brought on board during retrieval
- **Start and end latitude:** Document the latitude (in degrees, minutes, 1/100th of a minute) that the haul was set and retrieved.
- **Start and end longitude:** Document the longitude (in

degrees, minutes, 1/100th of a minute) that the haul was set and retrieved.

**Tip:** When an observer boards a vessel that has a GPS, check to be sure that it is recording in degrees, minutes, 1/100th of a minute. If it's not, ask the captain to change the view to 1/100th of a minute instead of seconds. (See Figure 5-16)



**Figure 5-15: GPS Showing Latitude and Longitude**

- **Depth:** Document the fishing depth in fathoms.
- **Gear type:** Enter a code for the gear type based on the configuration of the gear, and how it is being fished. (Example: If the vessel is using a fishing pole while under way (trolling), the gear type would be recorded as 15 - All Troll Gear.)
  - 7 Vertical hook and line
  - 8 Pole
  - 9 Other hook and line gear
  - 10 Fish pot
  - 15 All troll gear
  - 16 All other miscellaneous gear
  - 19 Longline (fixed hooks)
  - 20 Longline (snap-on hooks)



## Fixed Gear Complications

There are several complications that can occur during the sampling of fixed gear. For most cases, observers should discuss complications with their debriefer. This section will address known issues.

### Unsampled Sets

For sets that are not sampled, leave the OTC field blank. The weight method for the OTC of an unsampled set should be recorded as 6 - Other on the Trip Form.

Never use the vessel's estimate for OTC on a fixed gear vessel.

It should be noted in the Haul Comments that the set was not sampled. It is also important that gear performance "5-other gear lost" is not used when the set was not sampled.

### Lost Sets

Occasionally, vessels lose an entire set. If this happens record the following on the forms:

1. Record the fishing effort information the same as with any other set except use the Landing date and time from the Trip Form as the haul end time. Keep in mind that hauls are numbered in the order they are

retrieved, so lost sets will be your last set for the trip

2. Document gear performance code 5 - Gear lost on the Trip Form.
3. Leave the OTC column blank on the Trip Form, and document weight method 6-other.
4. Document total hooks/pots.
5. Leave the Catch Form blank and write notes on the back of it describing what happened.
6. Document what happened thoroughly in the logbook.

Occasionally, vessels lose a part of a set. They may lose hook or skates due to entanglement of gear. If this happens record the following on the forms:

1. **Trip form:** use weight method 8- Extrapolation and document total hooks/pots. In trip notes, document that hooks were lost.
2. **Catch form:** 'number of hooks/pots. Do not include the lost hooks on this form.

**Tip:** OTC does not have to be extrapolated if only individual hooks were lost

### Fish Ticket Weights (Retained Species only)

Because fishers participating in the live fish market are extremely concerned about the condition of their fish, collecting samples of retained individuals may not be possible. If it is not possible to collect and weigh a sample of retained fish for average weights and visual estimates were not made, delivery weights (fish tickets) can be used

to calculate the average weights of retained species. When using delivery weights:

1. **Tally ALL retained individuals by species by haul.**
2. Observe the weighing of the fish by species upon landing, if possible. If not, ask the skipper for a copy or look at the weights on the fish ticket.
3. Calculate average weight of species by:

**Calculation**

$$\text{Average Species Wt} = \frac{\text{Landing Weight of Species (lbs)}}{\text{\# of Individuals of Species Caught During ENTIRE Trip}}$$

4. For each haul, calculate the weight of retained species.

**Calculation**

$$\text{Species Wt by Haul} = (\text{Average Species Wt}) \times (\text{\# of Individuals Caught in Haul})$$

**Sample Method 5 - Fixed Gear Fish Ticket Verified**

Used for species whose weight is determined by using the fish ticket (landing receipt) weight AND when the observer has “verified” that the weight on the fish ticket represents the number of individuals per species in the retained tally sample. For a fish ticket weight to be considered verified, the observer must monitor the landing and be 100% confident that all fish in the tally sample are weighed at landing.

**Sample Method 6 - Fixed Gear Fish Ticket Unverified**

Used for species whose weight is determined by using the fish ticket (landing receipt) weight AND when the observer was not able to see the landing or is not confident all individuals in the tally sample were included in the fish ticket weight.

**Predated Pacific Halibut in Pot Gear**

Occasionally Pacific Halibut may be predated upon by sand fleas, crabs, or other fish inside of a pot.

Identification of these P. halibut is usually possible using the remaining parts of the fish, even when predation is severe. However if predation is severe, only the head and tail may be left in the pot making it impossible to length the fish.

- Measure the fish if the vertebra is intact and note the condition of the carcass on your decksheet. Record the length on the biospecimens form with a viability of Dead.
- If the vertebra is not intact, do not attempt to measure the parts. Note the situation on your decksheet. If multiple predated, unmeasurable P. halibut are encountered, tally them on your decksheet.
- Record the unmeasurable fish on your Catch Form as Weight Method 19. If other, intact halibut are in the set, record them as usual on the Catch Form with weight method 9 and record their lengths and viabilities on the Biospecimen form.

## Vessels that Head and Gut Sablefish at Sea

Observers collect biological information from retained sablefish caught on OR and WA fixed gear vessels, processing catch at sea. This processing involves removal of the head and guts from retained sablefish. In order to obtain this data that is important for stock assessment, observers are instructed to sample 5, randomly selected, retained sablefish per haul on head and gut vessels. Sex, length, and weight information and otolith extraction is collected from each individual before they are processed. All retained sablefish information collected, including the otoliths, is submitted to the state, by the observer or their debriefer.

## Trip Discard

On rare occasions, a vessel will discard fish from the hold. This happens if market conditions change during a trip or if they are catching larger fish that are worth more money. Record discard that cannot be attributed to a specific haul on the Trip Discard Form (See Figure 5-18).

The Trip Discard Form is not entered into the database system. Document the information from the Trip Discard Form in the Trip Notes on the Trip Page in the database.

- **Trip number:** This number is automatically generated by the database. Complete this field once

the trip has been started in the database.

- **USCG number:** Record the USCG vessel number posted on the exterior of the vessel or request this six or seven digit number from the vessel skipper or a coordinator. If the vessel does not have a USCG number, leave field blank and fill in the State Registration Number field.
- **Date:** Document the month (MM) and day (DD) that the trip discard took place.
- **Time:** Document the time, in PST military time, that the trip discard took place.
- **Species:** Document the common name of the species that was discarded.
- **Weight:** Document the weight, in pounds, of species discarded.
- **Number of fish:** Document the number of fish discarded (if known.)
- **Weight method:** Document the weight method used to estimate the species weight.
  - 1 Actual weight
  - 6 Other
  - 7 Vessel estimate
  - 8 Extrapolation
  - 9 PHLB length/weight conversion
  - 13 Tally Sample
  - 14 Visual experience
  - 19 PHLB length/ weight extrapolation
- **Discard Reason:** Record the skipper/crew's primary reason for discard.
  - 11 Incidental/accidental
  - 13 Market
  - 14 Other







Haul/Set #	Date	Time	Latitude		Longitude		Depth (fm)	Gear Type
			Degrees	Minutes	Degrees	Minutes		
Start								
End								
Start								
End								

Gear Units Sampled: 15 (20 set) Average Soak Time/Gear Unit: # hooks/gear unit: 145

Tally Sample

<p><b>Retained</b></p> <p>10 @ 48.75 (213) Sablefish  10 @ 49.50  10 @ 50.35  <u>30 @ 148.6</u></p> <p><input checked="" type="checkbox"/> <input type="checkbox"/> Shortspine Thornyhead D/O  5 @ 17.30  4 @ 12.50  <u>9 @ 29.8</u></p> <p>(32) <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> Rougheye  <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>  5 @ 22.50  5 @ 30.40  5 @ 37.15  <u>15 @ 90.05</u></p>	<p><b>Discarded</b></p> <p>Sablefish Predated Drop Off Smalls  <input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> (18)  3 @ 5 @ 5 @ 13.50 (cm)  5 @ 12.65 26  5 @ 14.00 23  <u>15 @ 40.15</u> 20  18</p> <p>Shorttraker/Rougheye D/O <input type="checkbox"/> (4)</p> <p>Spiny Dogfish <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> (19)  10 @ 19.60 <input checked="" type="checkbox"/> <input type="checkbox"/>  5 @ 13.45 <input type="checkbox"/> <input type="checkbox"/>  <u>15 @ 33.05</u> M 63, M 47, F 84, M 61, F 60</p> <p>PHLB  60  70   1 x 8.77 = 8.77  80  90 L 2 x 19.8 = 39.6  100 <u>3 @ 48.37</u></p> <p>Starfish <input type="checkbox"/> (4 @ 1.45)</p> <p>Giant grenadier dropped off Visual estimate  <u>1 @ 12 lbs</u></p>
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OMB Control No. 0648-0593 expires 9-30-2012

Figure 5-20: Longline Back of Catch form

Haul # 1

**SPECIES COMPOSITION FORM**

Trawl Biosampling List  
1 2 3

Page 2 of 3

Date 0 1 1 5 1 3

Trip Number 5 5 5 5 5

USCG # 5 5 5 5 5 5 5

Catch #	Catch Category	Sample Method	KP Weight	Species	Species Code	Sample Weight	Fish #	Discard Reason	Release method	Basket Weight	#	Basket Weight	#
			KP Number										
1	ZMIS	4	1276.97	SABL	203	1055.06	213						
			254										
				Shortspine Thornyhead	350	29.80	9						
				Rougheye	307	192.11	32						
2	ZMIS	4	155.13	SABL	203	14.86	3	15					
			53										
				SABL	203	24.77	5	12					
				SABL	203	48.18	18	13					
				SR/RE	354	24.01	4	12					
				Spiny Dogfish	66	41.86	19	13					
				Starfish U	20	1.45	4	13					

Trawl Sample Methods: 1-Whole haul species 2-Single basket 3-Multiple basket Fixed Gear Sample Methods: 4-FG Sample 5-FG(Verified Fish Ticket) 6-FG(Unverified Fish Ticket)  
Reasons for Discard: 11-Incidental/Accidental 12-Drop-off 13-Market 14-Other 15-Predation 16-Regulation 17-Safety 18-Market (Dockside only)  
Release Methods for RF (Nearshore Fisheries Only): TO-Tossed over MV-Mostly Verified DC-Mostly released at depth by cage DW-Mostly released at depth weighted line  
DD-Mostly released at depth other method OM-Other release method used NC-Not Collected

Species Composition Form v.10 Jan 2010

OMB Control No. 0648-0593 expires 9-30-2012

**Figure 5-21: Longline Species Composition form**

Species Composition Measurements and Calculations

Species	Measurements, Formulas, and Calculations
ZMIS 1	R SABL (148.6 lbs / 30 fish) x 213 = 1055.06 lbs R Rougheye (90.05 lbs / 15 fish) x 32 = 192.1066666 = 192.11 lbs
ZMIS 2	D SABL Predation (148.6 lbs/ 30 fish) x 3 = 14.86 lbs D SABL Drop Off (148.6 lbs/ 30 fish) x 5 = 24.7666666 = 24.77 lbs D SABL small (40.15 lbs / 15 fish) x 18 = 48.18 D SR/RE (90.05 lbs / 15 fish) x 4 = 24.0133333 = 24.01 lbs
	D Spiny Dogfish (33.05 lbs / 15 fish) x 19 = 41.8633333 = 41.86 lbs
OTC	(1492.47 sample weight / 2175 sampled hooks) x 2900 total hooks = <div style="text-align: right; border: 1px solid black; border-radius: 50%; padding: 2px; display: inline-block;">1989.96 lbs</div>

Figure 5-22: Longline Species Composition Calculations



# Examples: Pot

Page 1 of 1

**Trip Information**

Trip #      USCG #        or State Reg #

Observer Name Observer Fish Year

Vessel Name Starship Partial Trip  Total # of Fishing Days (KNOWN)

Fishery Catch Shares Vessel Logbook Name \_\_\_\_\_

Permit/License # GF 1234 Vessel Logbook Page # \_\_\_\_\_

First Reciever Newport Fishes Observer Logbook # 9871  
(CS only)

Skipper's Name Jim Finneas # of Crew 4  
(including captain, not including observer)

Departure Date/Time 03 / 01 / 2013 0220 Departure Port Newport, OR

Landing Date/Time 03 / 01 / 2013 2310 Landing Port Newport, OR

Fish Ticket #								WOC	Date
<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>	<input type="text" value="4"/>	<input type="text" value="5"/>	<input type="text" value="6"/>	<input type="text" value="7"/>	<input type="text" value="8"/>	<input type="text" value="O"/>	<input type="text" value="03/02/2013"/>
<input type="text"/>									

**Haul Information**

Haul/ Set #	Observer Total Catch Estimate	Weight Method	Total Hooks/Pots	Gear Perf	Seabird Avoidance (gears 7, 9, 19, & 20)	Avg. Soak Time (m = minutes, h = hours)	Comments
1	1174.63	8	20	5		< 1m 1-5m 5-15m 15-30m 30-45m 45-60m 1-2h 2-6h 6-12h 12-24h 24-36h 36+h	Lost 2 pots
						< 1m 1-5m 5-15m 15-30m 30-45m 45-60m 1-2h 2-6h 6-12h 12-24h 24-36h 36+h	
						< 1m 1-5m 5-15m 15-30m 30-45m 45-60m 1-2h 2-6h 6-12h 12-24h 24-36h 36+h	
						< 1m 1-5m 5-15m 15-30m 30-45m 45-60m 1-2h 2-6h 6-12h 12-24h 24-36h 36+h	
						< 1m 1-5m 5-15m 15-30m 30-45m 45-60m 1-2h 2-6h 6-12h 12-24h 24-36h 36+h	
						< 1m 1-5m 5-15m 15-30m 30-45m 45-60m 1-2h 2-6h 6-12h 12-24h 24-36h 36+h	
						< 1m 1-5m 5-15m 15-30m 30-45m 45-60m 1-2h 2-6h 6-12h 12-24h 24-36h 36+h	
						< 1m 1-5m 5-15m 15-30m 30-45m 45-60m 1-2h 2-6h 6-12h 12-24h 24-36h 36+h	
						< 1m 1-5m 5-15m 15-30m 30-45m 45-60m 1-2h 2-6h 6-12h 12-24h 24-36h 36+h	
KP Checks	1174.63		20				

Figure 5-24: Pot Trip Information form

**FIXED GEAR CATCH FORM\***

Haul #  Page 1 of 3

Date       Trip Number      USC #

Catch #	R or D	Catch Category	Sample Weight	#'s of Fish	# Hooks/Pots	Weight Method	Catch Purity	Discard Reason	Comments
				Req. for wt. methods 6, 9-14	sampled by catch category				
1	R	ZMIS	992.88		18	13	M		
2	D	ZMIS	50.49		18	13	M		
3	D	PHLB	13.8	4	18	16	P		
Keypunch Checks			1057.17	4	54				

\*Gear Types 7, 8, 9, 10, 15, 16, 19, 20

Fixed Gear Catch Form v. 7 January 2010  
OMB Control No. 0648-0593 expires 9-30-2012

**Figure 5-25: Pot Fixed Gear Catch form**

Haul/Set #	Date	Time	Latitude		Longitude		Depth (fm)	Gear Type
			Degrees	Minutes	Degrees	Minutes		
Start								
End								
Start								
End								

Gear Units Sampled: 18      Average Soak Time/Gear Unit: N/A      Fit # 8      # hooks/gear unit: 20 Pots Set  
 Cal. Wt 11      Lost Pots L

Retained

Tally Sample

Discarded

SABL 195  
 10 @ 48.65  
 10 @ 55.20  
 10 @ 47.00  
 30 @ 150.85

SABL Predated  
  8

$\frac{150.85 \text{ lbs}}{30 \text{ fish}} \times 8 \text{ fish} = 40.2266666 = 40.23 \text{ lbs}$

$\frac{150.85 \text{ lbs}}{30 \text{ fish}} \times 195 \text{ fish} = 980.525 = 980.53 \text{ lbs}$

Dover 5 @ 9.65

Decorator crab 2 @ .05

Shortspine Thornyhead 3 @ 10.7

Anemone 7 @ .65

Redbanded RF 1 @ 1.65

PHLB  
 62 Dead (sand fleas) = 5.93  
 45 Excellent = 2.09  
 52 Excellent = 3.35  
 47 Excellent = 2.43  
 = 4 fish @ 13.8 lbs

OTC =  $(1057.17 \text{ lbs} / 18 \text{ pots}) \times 20 \text{ pots} = 1174.633333 = 1174.63 \text{ lbs}$

OMB Control No. 0648-0593 expires 9-30-2012

Figure 5-26: Pot Species Composition form

Haul #

**SPECIES COMPOSITION FORM**

Trawl Biosampling List Page 2 of 3  
1 2 3

Date       Trip Number      USCG #

Catch #	Catch Category	Sample Method	KP Weight		Species	Species Code	Sample Weight	Fish #	Discard Reason	Release method	Basket Weight	#	Basket Weight	#
				KP Number										
1	ZMIS	4		992.88	SABL	203	980.53	195						
				199										
					SSPN	350	10.7	3						
					Redbanded RF	308	1.65	1						
2	ZMIS	4		50.49	SABL	203	40.23	8						
				22										
					Dover	107	9.65	5						
					Decorator crab	39	.05	2						
					Anemone	55	.65	7						

Trawl Sample Methods: 1-Whole haul species 2-Single basket 3-Multiple basket. Fixed Gear Sample Methods: 4-FC Sample 5-FC (Verified Fish Ticket) 6-FC (Unverified Fish Ticket) Species Composition Form v.10 Jan 2010  
Reasons for Discard: 11-Incidental/Accidental 12-Drop-off 13-Market 14-Other 15-Predation 16-Regulation 17-Safety 18-Market (Dockside only)  
Release Methods for RF (Nearshore Fisheries Only): TO-Tossed over MV-Mostly Vented DC-Mostly released at depth by cage DW-Mostly released at depth weighted line  
DO-Mostly released at depth other method OM-Other release method used NC-Not Collected OMB Control No. 0648-0593 expires 9-30-2012

Figure 5-27: Pot Species Composition form

BIOSPECIMEN FORM

Haul # 1

Catch #	Date	Catch Category	Sex	Species Name	Species Code	Discont Reason	Method	Sex	KP Length KP Weight	Length	Weight	Vability	Adipose Present	Maternity Stage	Dissection Type	Barcode #	Dissection Type	Barcode #	Comments (tag #)	
																				1
3	030113	PHLB	F	PHLB	101	16	9		206	62		D								
										45		E								
										52		E								
										47		E								

Bio Form Sample Methods : 6-Outside and Nonrandom 7-Outside and Random 8-Inside and Nonrandom 9-Inside and random  
 Dissection Type: 1 - Otoliths 2 - Scales 3 - Snouts 4 - Tissue 5 - Fin ray

Biological Sampling Form v 11 October 2011 OMB Control No. 0648-0593 expires 9-30-2012